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ORIGINAL ARTICLES.

"THE EFFECT OF HARNESSING UP INDIRECT VISION."

BY DOLPHUS E. COMPERE, M.D.,
DALLAS, TEXAS.

Briefly speaking, the eye is a dark chamber with a series of convex refracting surfaces and certain intraocular media or watery substances.

The sense of sight consists of three visual perceptions or subsenses, viz.: Light sense, color sense and form sense. Light sense is to be able to perceive graduations of the intensity of illumination. Color sense is the power of distinguishing light of different wave lengths. There are three sets of color perceiving elements: those for blue, red and green. These are termed primary colors, all others are compounds of them. Blue has the largest field of color, next comes red, while green has the smallest field. In other words, green excludes more light than any single color known. Form sense, or acuteness of vision, is the faculty the eye possesses of perceiving the shape or form of objects.

The field of vision is divided, first, into central or direct, which is to fix the eye on one object and see clearly and distinctly. Second, peripheral or indirect vision, is to see around the one point and see objects not looked at, which are less distinct or a duller sensation. Example: If standing on a hill, we fix the gaze of one eye on some special object on the plain below, the field of vision includes not only that one object but many others even for miles around it. If the fixation object be nearer us, the area taken in by our field of vision will be proportionately diminished in extent. The average normal field of vision,

which is the limit of indirect vision, is temporal ninety degrees, nasal sixty degrees, above sixty and below seventy degrees. The nose and eyebrows project into the field of vision and limit it.

The evil effects of the constant strain and excessive demands upon the muscles of accommodation, to exclude this indirect vision, to the extent of preventing it from interfering with the direct vision, are manifested by spasm or cramp, which produces blurred or indistinct vision. After continuing this over-taxing, say for distant objects, the eye uses up part of its accommodative energy, which actually leaves less at disposal for near objects. In extreme cases of high degree accommodative spasm, serious errors might arise if this cramp is overlooked, and often a person cannot maintain a sustained view of an object at any distance without suffering pain in and around the eyes.

Scientifically speaking: Accommodation means adjustment of the eye for various distances on one special field or object. Example: Hold a book before the eyes at the average reading distance, and you will note that you cannot read the top and bottom lines at the same time. Each line requiring a separate focus. This concentration is produced by the contraction of the pupil. The iris is known to be carried forward, by pressure from the anterior surface of the lens, which has become more strongly curved. Such lens pressure, the iris remaining inactive, would tend to increase the diameter of the pupil. On this account, greater efforts of the sphincter will be necessary to counteract this action of the lens-surface, when accommodation is present, than it would with accommodation relaxed.

The additional stimulus to contraction is undoubtedly due to the increased area of illumination. This would seem to imply that the contraction of the pupil not only responds to the light intensity (quality), but also to its area (quantity) upon the retina.

Light is imponderable. Its rays, reflected from various objects, pass through the cornea, the aqueous humor, the crystalline lens, the vitreous body and there reach the retinal nerves.

The delicacy of this touch or impact on the sensitive retinal nerves, is beyond the conception of the human mind, yet it establishes from this contact an impulse which is conveyed to the visual centers of the brain, which with no uncertainty, determine form, color, motion, quantity and space. How such vision is accomplished is a mystery.

It is also evident that the impairment of vision should be ascribed to that factor causing the largest area of diffusion upon

the retina. Pupils differ in size in different individuals. The larger the pupil, the greater will be the zone of peripheral aberration and its correlated diffusion-area, and the more indistinct the vision. In fact, "the peripheral aberration upon the optical axis is known to increase, not only in proportion to the square of the aperture, but also with the degree of refraction" (physical law), so that we should have greater diffusion circles upon the retina, when the ciliary muscle is brought into action, even in emmetropia, to correct the peripheral aberration which impairs the sharp definition. The only stimulus which could assist in correcting the aberration in this case would be that which, imparted to the iris from the retina, would cause the pupil to contract sufficiently to exclude the peripheral rays. Asthenopia is therefore quite as apt to be experienced on account of the size of the pupil, as it is on account of the error of refraction.

It is questionable whether the eye can discriminate between images which are impaired by peripheral aberration and those which are illy defined from slight refractive errors. Thus: By placing a 1 D. convex lens before the emmetropic eye, it is practically rendered myopic for distance, the letters of the test-card at 6 m. becoming indistinct, with a probable reduction in the visual acuteness to say $6/9$. If the lens be now covered with a pinhole disk, normal acuteness of vision will be re-established, with no other appreciable difference than that the field and illumination are less. With the pinhole disc applied, the small beam of light, uninterruptedly, strikes directly upon the center of the fovea centralis in the macula lutea of the retina. This is absolute, true, direct vision, which might well be termed central fixation, while the vision from the entire retina might be spoken of as eccentric fixation. If, therefore, increased aberration is to be avoided, the pupils must contract concurrently with accommodation.

In those cases of normal pupil, where the perceptive qualities of the retina are good, and the error of refraction is slight, retinal stimulus will prompt contraction of the pupil sufficiently to exclude aberration. Is it not probable that, in some cases with large pupils, protracted efforts of this kind would result in fatigue of the iris? Could not asthenopia be produced by that prolonged ineffectual effort of the sphincter, to regulate the volume of light upon the retina, to such a degree as shall be most agreeable to our light-perceptive sense, which strain would have to be in excess of the normal qualitative and quantitative light stimulus, to correct aberration?

The improvement in vision, which the myope, of low degree, with large pupils, secures by the lenticular correction, is practically due to the fact that the peripheral aberration is decreased, through reduced refraction obtained by the concave lens. The rays, emitted from the concave lens, enter the pupil with a divergence, counteracting the excessive convergence of the rays which are imperfectly focused by the crystalline lens upon the retina.

In those cases where the quarter-diopter lens seems to relieve distress it will generally be found that the pupils are comparatively large. And the larger the pupil, the more pronounced will be the improvement in visual acuteness obtained by low-degree corrections.

It is a common occurrence for a patient to wear a weak lens for a while, then lay it aside without feeling any discomfort, even though the optical error has not changed. Upon closer examination we frequently find that the pupils seem smaller than they were at the time the glasses were prescribed. The size of the pupil being the only apparent change, are we not justified in suspecting the iris, by reason of disturbed innervation, as having been at least implicated in the cause of asthenopia?

Injuries from sunlight and strong electric lights often result in chemical and atrophic changes which destroy the finer structures of the rods and cones of the retina, and the fibers of the optic nerves and tracts with even atrophy of the visual centers.

Snow-blindness has been ascribed as the result of irritation of the retina from prolonged exposure to light. The ultra-violet rays are held responsible for much of the damage to the eyes by various lights and flames.

Practically speaking: Of the five special senses that of sight is unquestionably the most important. What greater calamity can befall one than complete loss of vision? How sad for the individual, how pathetic for the observer, are the sightless days of those who previously enjoyed work, pleasures and the wonderful beauties of nature, dependent upon our most valuable possession, *perfect vision*.

Sight is not passive. It is an active function, and although we see apparently without effort or volition, yet every moment of vision is costing its adequate amount of vital energy. We think nothing of working our little delicate eye muscles sixteen or more hours each day, year after year, yet wonder why they feel tired at times, or how such strain could cause general ill-health, yet if we should work any other part of our body one-

half so constantly we would be physical wrecks in short order.

Why are there more people wearing glasses to-day, than in any age in the history of the world? Simply because we are deviating farther from nature than ever before, taxing the eyes more and more, and as the result we are having to pay the penalty of week, strained eyes, blurred vision, headaches, reflexes and glasses. A glass to the eye may be classed as a brace to a sprained ankle, to relieve the strain. Our forefathers never worked over small, close figures, under strong artificial illumination for hours, days and years as we do. They knew nothing of the constant strain of the moving picture show, nor the bright glare, sunshine and sand from an automobile, as well as many, many strenuous tasks we impose on our eyes every day and think nothing about it.

Science, no matter how scientific, benefits humanity little, unless its findings can be crystallized into practical application. Therefore, by harnessing up this indirect vision when not needed, and relieving the eyes of a useless expenditure of accommodative power, we will render them more capable of producing even extremely strenuous work with less ill results.

I have a device which is a mechanical concentrator, and will relieve the muscular spasm in the act of accommodation. It consists of a cup shaped mounting or goggles, that fit close around the eyes so as to exclude all light, with an adjustable diaphragm before each eye. Open the diaphragms depending upon the distance from the object and size of field included, close the diaphragms until you exclude everything except that which you desire to see. This not only makes your vision clearer, but is very much more restful to the eyes. Just inside of the diaphragms there is a groove in which any individual's special correction lenses can be mounted. In this way it will not interfere with a refractive error, but will serve those who wear glasses as well as those who do not, and it will relieve and prevent eye-strain, as well as save eyesight.

I have written the following letter to quite a number of the leading ophthalmologists of the United States, viz.: Dear Doctor, from your extensive study of ophthalmology can you refer me to the most complete books or articles on "The direct and indirect vision and the relation one has over the other, or the effect of harnessing up indirect vision"? I have been working along this line for over a year and believe by overcoming indirect vision when you desire to concentrate on one special field or object, you will relieve a spasm which often produces blurred vision, headaches, reflexes and even muscular defects. Example: Did you ever

read while riding on a train and have the passing objects give you a headache? This pain results from the strain of having to overcome indirect vision. Any suggestions along this line certainly will be highly appreciated.

With personal permission from each writer, I desire to quote the following replies: Dr. Casey A. Wood, of Chicago, writes, "The subject is a fascinating one which has not, as yet, received that attention which it deserves at the hands of ophthalmologists. I cannot, however, agree with you as to the causes of the panorama symptoms you mention; most of them are probably the result of oculo-muscular defects, combined or not with, generally, oblique astigmatism, etc. I do not believe that the patient's indirect vision has much to do with it. Of course, these are merely desultory remarks. The subject that heads your letter might well occupy a hundred pages and yet not exhaust it. However hoping these few remarks will be of some use to you, I remain, sincerely yours."

A letter from Dr. Geo. E. deSchwenitz, of Philadelphia, reads: "I do not know of any book or monograph which deals specifically with the subject concerning which you write. With the subject thus described I would refer you to 'Von Helmholtz's Physiologic Optics,' and the chapters which relate to the visual field, visual fatigue, etc. I would not myself have thought of attributing the headaches which you describe to the cause which you consider active, but I have made no studies from the standpoint you refer to. Should I find anything relating directly to this subject which interests you, I shall be glad to send it. Wishing you success in your researches, I am, very truly yours."

Dr. Alexander Duane, of New York City, says: "I cannot refer you offhand to any literature bearing on the relation between direct and indirect vision, in the sense in which you have in mind."

Dr. Edward Jackson, of Denver, replies: "I do not know of any attempts to deal with the question you suggest, nor many papers even bearing upon it."

Dr. John E. Weeks, of New York City, adds: "There are undoubtedly various phenomena due to indirect vision that are seldom given much attention by ophthalmologists. I shall be pleased to know the results of your studies."

Dr. L. Webster Fox, of Philadelphia, advises: "Your most interesting communication of several days ago has been received and contents noted. I really do not know of any book dealing

with the subject you mention, but if any one has written on this subject it would be Dr. Casey A. Wood, of Chicago."

Others who agree with Dr. Adolf Alt, of St. Louis, in his expression, "I am very sorry to be unable to give you any information on the subjects you desire to know," are as follows: Dr. Lucien Howe, of Buffalo; Dr. Charles H. May, of New York City; Dr. Frederick H. Verhoeff, of Boston; Dr. J. W. Kimberlin, of Kansas City, and F. A. McGill, of the Optical Publishing Co., of New York City.

Dr. G. C. Savage, of Nashville, says: "I do not know in what direction to refer you in your study which you have taken up. I suspect that you are invading a new field that you will probably have to cultivate alone. May you succeed in bringing out the truth."

Dr. H. Gifford, of Omaha, Neb., replies: "I do not know of any literature bearing on the point that you mention in your letter. There may be something of the sort with which I am not acquainted. The idea is new to me and is decidedly interesting. If I come across anything bearing on the subject, shall make it a point to write you."

I am especially indebted to Charles F. Prentice, M. E., of New York City, for the many valuable suggestions which he has given, and the help I have received from his article entitled, "The Iris, as Diaphragm and Photostat."

Dr. Luther C. Peter, of Philadelphia, comments: "Your studies along the line of direct and indirect vision are very interesting indeed. I have made similar observations, and I am sure that the confusion from indirect vision is responsible for a good many reflex headaches and headaches ordinarily attributed to muscular defects."

Dr. Matthias L. Foster, of New Rochelle, N. Y., adds: "I regret that I am unable to help you by suggestions along the line indicated. The theory is new to me and I shall be interested to study it when published."

Dr. David Webster, of New York City, writes: "So far as I know, there are no books or articles on the direct and indirect vision and the relation one has over the other, or the effect of harnessing up indirect vision. In your working along this line I hope you may evolve something *useful* as well as scientific."

OPTIC NERVE INVOLVEMENT IN SPHENOIDAL AND
ETHMOIDAL DISEASE WITH RAPID DIMINU-
TION OF VISION FOLLOWING THE
ADMINISTRATION OF SALVARSAN.

BY J. W. CHARLES, M.D.,
ST. LOUIS, MO.

On December 7th, 1914, A. E., 39 years old, came to be examined for reading glasses. He also complained rather vaguely of headaches. O.D., V=23/96; O.S. V=23/24. The ophthalmoscope gave the discs slightly hyperæmic with a slight streaking along the vessels at their emergence from the nerve. The visual fields were taken by Dr. Harvey D. Lamb, first with the stereoscope, then on the scotoma board, and finally with the perimeter, showing an enlargement of the normal blindspot and a narrowing for colors, but not for form.

The patient was referred to Dr. Greenfield Sluder, who reported a hyperplastic sphenoiditis and ethmoidal abscess, advising immediate operation. The patient insisted upon postponing the operation until the return of his wife in a few weeks. In four days, the vision of the right eye had fallen to 23/120, that of the left remaining 23/24. He was examined as frequently as his position as a waiter would permit for a week, when he was finally persuaded to undergo a Wassermann, which proved to be +++++. He was immediately sent to a syphilologist with an explanation of his condition; but the patient, with his usual procrastination, did not appear until after the first of January. On January 6th, he received at the Barnard Skin and Cancer Hospital 0.5 gm. salvarsan by the intravenous method. On the following day while hurrying to work, he reported a slight disturbance in vision. Nothing was discovered with the ophthalmoscope. On the second day the trial gave O.D., V=4/240; O.S., V=23/48.

On the third day, the vision of the right eye had risen to 10/240, that of the left remaining at 23/48. On January 11th, the fifth day, O.D., V=18/240; O.S., V=23/60.

January 20th, O.D., V=again 18/240; O.S., V=23/120.

January 20th, O.D., V=23/192; O.S., V=23/150.

The patient disappeared and in May visited the St. Louis Eye, Ear, Nose and Throat Infirmary. Dr. Bryan later operated upon the middle turbinate and opened both sphenoidal ostia, after which the patient was treated by applications into the sphenoid.

"Nothing but a small amount of secretion was ever found in the sphenoids."

In a case like the above, the questions which present themselves are whether (1) this was a simple syphilitic atrophy of the optic nerves coincident with an independent disease of the sinuses; (2) whether the atrophy was caused by the sinus trouble and whether the latter in its turn was caused by syphilis; (3) whether the giving of the salvarsan was the cause of the sudden diminution of vision or coincident with it; (4) whether, if we had had the temerity to operate after the great fall of vision, there had been any likelihood of benefit, or whether with the reaction in the nerve or sinus, produced by the salvarsan, an operation would have excited even more violent processes.

In spite of the many recent assertions of syphilologists, that the atrophies seen after salvarsan injections would have occurred in any case, I believe that most of us prefer mercury injections and inunctions where the optic nerve is already involved, in spite of former contentions that even these have been accused of causing or hastening atrophy. I believe that we would hesitate to have salvarsan used on ourselves under those circumstances.

It now seems to be generally admitted that with normal nerves salvarsan is not neurotropic, and, in those cases of cranial nerve disturbance which flare up after injection, there is a liberation of endotoxines from a group of dead spirochaetes which causes a tissue reaction (Herxheimer). This reaction is not so apt to affect the non-vascular tissue of the nerve itself, but more probably affects the nerve through the neighboring structures in which it lies. Thus the many forms of "meningotropism," which term seems to express most clearly the affections of the cranial nerves observed after the administration of salvarsan, are explained. Ehrlich found, in 25,000 to 30,000 cases, only one in which a healthy nerve showed signs of beginning atrophy after the injection, and this case had received courses of treatment with atoxyl and enesol.

In this connection, Gebb's views (reported in the *Amer. Journ. of Ophth.* from the *Medizinische Klinik*, September 1, 1912, through the *New York Med. Journal*) prove interesting concerning the "Toxic Action of Salvarsan on the Papillo-macular Bundle." He opposed those authors who argued that the neurotropic action of salvarsan caused the irritations of certain cranial nerves called by Ehrlich "Neurorecidiv," which are in reality relapses of the syphilis, which occur after and in spite of the injection. "In a number of his cases the papillo-macular

bundle was rapidly influenced for the better," which was evidence to him that salvarsan was not poisonous to this nerve, and "the hyperæmia of the nerve sheath of the optic nerve or retinal hæmorrhages or central scotoma after salvarsan injections are merely the neurorecidivs of Ehrlich." However, the suddenness of the onset of some of the cases reported seems to point to a direct reaction from the effect of the drug itself; and now that we know that many of these scotomata are the result of accessory sinus disease, there is a possibility that some of the reported cases are the result of a Jarisch-Herxheimer reaction in the sinus indirectly affecting the papillo-macular bundle of the nerve.

Another aspect of the subject lies in the fact that after a Herxheimer reaction one expects either a marked improvement in symptoms or at least an amelioration after renewed dosage. This has happened in cases of iritis. However, if the nerve fibres themselves have been injured by the acute reaction, either in the sinus or in the nerve, improvement cannot take place.

Terlinck (*Zeitsch. f. Augenh.* V. 31, p. 500) noticed that iris-recidivs occur immediately after the injection, i.e., in a few days, while the so-called neurorecidivs do not occur for several weeks or months, which is perfectly consistent with the theory that iris recidivs are Herxheimers and neurorecidivs are simply relapses of the disease.

To conclude, it is fairly well agreed that salvarsan is not neurotropic. Two factors are necessary for a reaction in a nerve, viz., the presence of spirochætes in the nerve (the possibility of which has been demonstrated by Hoffmann and Ehrmann, Strassman (cranial nerves), and Verhoeff (optic nerve), and access of the salvarsan to the spirochætes, which seems to be doubtful from the suggestions of Schoenberg, whose experiments seem conclusive that very little medication if any can reach the optic nerve in sufficient quantity either from intravenous or intraspinal injection. What seems more probable is that the more vascular tissues around the nerve reacted, and in this manner injured the nerve.

If one assumes the correctness of the contentions of syphilologists, that salvarsan is not neurotropic, and if future investigation confirms the suggestions of Schoenberg, etc., viz., that medication cannot possibly reach the optic nerves through venous or spinal injection, but that application must be made through the cerebral ventricles alone, then this case would resolve itself into a so-called Herxheimer reaction in the sinuses involved, with consequent rapid injury to the nerves.

NOTE ON REVERSE SEEING.*

BY DR. M. BARGY.

The article by Bourgeois on reverse seeing which appeared in *Ophtalmologie Provinciale* and was reported in the May number of the *Clinique Ophtalmologique*, reminded me of a case which resembles those of our colleague. When I was told the circumstances I gave them at first no credence, yet this occasion sufficed to awake my memory and to shake my former conviction.

About 4 years ago at a dinner with one of my friends I was seated next to a young lady, who as is usual directed the conversation on medical subjects. She especially dwelt on relating to me that seven years previously she had at different times observed on herself the following curious phænomena. At that time she was finishing her studies to obtain her diploma and, without permitting her parents to know, had spent her nights in preparing for her examinations by the aid of the poor light of a candle. One evening when she had read and written more than usual she had to interrupt her work, an atrocious headache raged in her temples, the letters danced before her eyes and at the same time each letter appeared reversed. After several moments of rest the phænomena disappeared only to return twice more at different times the same evening. She had to give up reading altogether.

During the same week at three different occasions the same symptoms returned. She did not dare to tell her parents, but she went to an optician to find out whether she did not need any glasses. All the glasses she tried blurred her vision. Finally, soon after she passed her examinations and got her degree, and since then those visual symptoms have never reappeared. She looked very well, but seemed to be very emotional; she called herself very "neurasthenized", and her great trouble was that she had now been married for five years without having given birth to a child. Of course, I could not examine her; she was said to be very intelligent, but somewhat bizarre in her manner; she was generally looked upon as being not well balanced. This was one more reason why I gave little belief to her story; I thought rather of a severe strain of the eyes the symptoms of which were badly described and badly interpreted. I have not seen the lady again, who has moved away, but I have subsequently heard that she was subject to hysteriform attacks.

*La clinique ophtalmologique, October, 1916.

It seems to me that if we thought of searching for these symptoms we would encounter them more often than is generally believed.

Their observation is more difficult because they are fleeting and simulation may be frequent; finally, it is rare that the patient is intelligent enough to draw spontaneously the physician's attention to these symptoms. I may be permitted to cite a little known example of seeing reverse, that of Georges Sand.

During her voyage to Venice with Musset she became seriously ill; hardly had she overcome this malady when Musset in turn fell ill also. She nursed him with motherly devotion, passed the nights at his bedside, although disharmony had been already reigning for some time between these two lovers. Finally Musset got well and returned to France leaving his mistress behind, who was physically and psychically overworked and disturbed. In her "Memoirs of my life" she writes:

"I had accompanied him in a gondola early in the morning to Mestre and I returned home by the small canals of the interior of the city. . . . All these narrow canals which serve as streets are traversed by small bridges of one arch for the passage by foot; my vision was so used by the night watches that I saw all objects reversed and especially these rows of bridges which presented themselves before me as arches turned over on their bases."

Here is a remarkable example of seeing reverse and in every way comparable to the one I cited above. Here the intelligence of the patient cannot be doubted, neither her good faith. I shall not try to explain the pathogenesis of this symptom; all sorts of theories are possible, except a congenital disposition of the optic tracts. There is one common cause: the intellectual and visual overwork. Seeing reverse appears here as a fleeting epiphæ-nomenon of a special psychical state.

GENERAL MEDICATIONS.*

BY DR. A. DARIER.

(Concluded from January number.)

Although the mercurial medication with which we have just occupied ourselves for some time, is one of the most important therapies, arsenical medication has in the last few years gained such a place for itself, that we must devote a special chapter to it.

It has been known for a long time that mercury is the real antidote for syphilis. It does not only make its symptoms disappear, but also destroys the germs themselves, the spirochætæ. This has been shown by Neisser and Metschnikoff in monkeys. Uhlenhut, Neisser and Metschnikoff have, moreover, established the fact that certain arsenical preparations, too, can completely destroy the syphilitic virus without injuring the animals experimented on.

The ideal of therapy and particularly of chemotherapy is to find chemical agents which have the largest possible parasitotrope action combined with the smallest possible organotropism.

Arsenic is one of the most powerful therapeutic agents, but its toxicity is, also, of the highest.

The chemists have understood that it was necessary to find compounds which have minimal toxic qualities in order to be able to use the strongest doses. Armand Gautier has opened the way with the cacodylates. Ehrlich and Hata after numerous experiments have given us atoxyl, then arsacetine, then arsenobenzol, all of them very powerful agents against syphilis. Atoxyl injected in the monkey in from 5 to 13 days after the inoculation of syphilis prevents this disease from breaking out. Most of the animals remain in perfect health and can later on contract a new syphilitic infection. Besides this preventive action of atoxyl, an evident curative action can be seen in the syphilis of the monkey, as well in the first few days after infection, as after several months. In man atoxyl acts in the same manner.

Unfortunately, a fact which had not been noticed in the monkey, atrophy of the optic nerves has been found to occur following the treatment with atoxyl, not counting the cases of death caused by too strong and too often repeated doses. There-

*(Extract from Compendium et répertoire de thérapeutique oculaire générale et spécial. Soon to be published.) La Clinique ophtalmologique, August and October, 1916.

fore, Ehrlich sought another arsenical preparation and, after arsacetine, recommended salvarsan (dioxydiaminoarsenobenzol or 606), or still better neosalvarsan (combination of salvarsan with the formaldehyde sulfoxylate of sodium), which is instantly soluble in water, which greatly facilitates its employment and permits of every practitioner making intravenous injections with the greatest ease. A report, perhaps slightly exaggerated, makes Ehrlich say that the use of arsenobenzol is only of insignificant risk when compared with its great advantages, which are, a rapid and certain action on the syphilitic process and the possibility that the patients can leave the hospital after eight or ten days, while the mercurial treatment gives the same result only after six or eight weeks. Moreover, 606 has, also, a powerful action on syphilis which has resisted the treatment with mercury and iodide. He concludes, therefore, that in time the arsenical treatment in syphilis will be the one of choice. Neisser adds: arsenobenzol has undoubtedly a specific action against syphilis; it largely surpasses the brilliant results obtained with mercury and iodide.

A tangible proof of its efficiency is given by its action on the spirochætae, which disappear from the superficial lesions, chancres, mucous patches in from 24 to 48 hours after each dose of arsenobenzol. They are partly destroyed, partly sterilized as to their production (Neisser). This parasitrope and parasitocidal action has been proven by numerous observations, especially by experiments on animals. The specific actions of 606 is, also, demonstrated by the rapid disappearance of the Wassermann reaction.

But we must not permit ourselves to be carried away by an excessive enthusiasm, as was the case after the discovery of tuberculin by Koch.

It is easy to say that arsenobenzol is toxic only when the dose of 10 centigrammes per kilogramme of rabbit is surpassed. The numerous published cases of death, and more even the unpublished ones, have luckily already brought even the most fanatic arsenophiles to abandon the large doses, the maximal sterilizations which sterilize the microbes and their host. We read with pleasure that in 1915 Wechsellmann himself has advocated doses of 0.15, 0.30, 0.45 of neosalvarsan or salvarsan sodium, easily soluble in water and of the same sterilizing power. On the other hand he shortens the interval between the injections and makes long series of them up to 50 in order to reach total doses of from 4 to 6 grammes.

The manner of administering arsenobenzol is of prime import-

ance. The parasitotrope action manifests itself more certainly and more quickly by intravenous injections than by hypodermic ones.

The reaction formerly so violent and often dangerous caused by the injections of considerable quantities of more or less acid or more or less alkaline fluids, which produced a certain amount of traumatism to the blood corpuscles or at least a profound alteration of the blood, can to-day be avoided in a great measure. These reactions manifest themselves by a marked congestion towards the head, violent headaches, noises in the ears, with pulsation in the temples preceded or accompanied by chills, nausea, then vomiting, abundant sweats, sometimes collapse. These symptoms have been seen often enough, though in a slighter degree, after intravenous injections of colloidal solutions, they are much more dangerous with arsenobenzol, on account of its intense toxic properties, which act especially on the nervous centres, the liver and kidneys, as many autopsies have proven.

In any case, to-day the use of neosalvarsan soluble in water in any dose permits us to avoid the so-called hydric reaction, and if we stick to moderate doses we can avoid the greater part of the toxic complications, especially if we take good care of the following contraindications: (1) Heart diseases, organic affections of the myocardium and the cardiovascular system, cardiac neurosis, etc. (2) Nephritis and serious diabetes, when not specific. (3) Degenerative affections of the nervous system, general paralysis or advanced tabes. (4) Tuberculosis with hæmoptysis. (5) Marasmus, senility and cachexia, when not syphilitic.

Unfortunately all these contraindications are not sufficient to safeguard against catastrophies, which can only be explained by an idiopathic condition. We must, therefore, in a general way renounce all intensive treatment by massive doses or by weak but increasing doses, which are always very dangerous when we deal with an agent the cumulative action of which is very much to be dreaded.

The toxicity of neosalvarsan is weaker than that of salvarsan. Its very easy intravenous administration is less often accompanied by accidents.

No apparatus is needed for its injection. A syringe of 3 to 5 cc. suffices, for neosalvarsan even in a concentrated solution does not coagulate albumen. We can inject up to 0.90 of neosalvarsan in 5 cc. of distilled water, which greatly simplifies things. Since it was believed that neosalvarsan acted less powerfully

than the old 606, the trial has been made to return to this product by combining it with sodium.

Salvarsan sodium (salvarsanate of sodium or salvarsan natrium), which is soluble in distilled water, but which it is best to use only in 1 per cent. solutions, again complicates things.

Its therapeutic action in all manifestations of syphilis is almost equal to that of salvarsan. This should be the most energetic medicament for treating an attack of syphilis and the most certain for aborting this dreadful scourge. It often cures in cases in which mercury and iodide have failed.

Duhot, who has used neosalvarsan often, advises not to exceed in a strong man the dose of 6 grammes in 30 days for fear of causing an action (chronic arsenical intoxication) on the nerve extremities, like the peripheral neuro-tabes of Déjerine. The patients complain of creeping in the feet, disturbances of sensibility, cold feet, numbness, disappearance of the plantar, Achilles tendon, and finally of the patellar reflexes; but I have never seen affections of vision or hearing, as were seen so often with atoxyl and sometimes with salvarsan.

On the other hand we must not forget that there are individuals which are very easily poisoned by arsenic. Cases of death attributed to salvarsan are numerous, and neosalvarsan, employed only for a short time, is already responsible for quite a number of cases. We can, therefore, not be too careful in prescribing an arsenical treatment.

Since the advent of salvarsan it has been observed that the meningeal complications of syphilis have become more frequent, and such cases in a latent state have been quickly transformed under the influence of arsenical preparations into degenerative medullary or cerebral affections. For this reason McDonagh believes that if there are no evident syphilitic manifestations it is best to abstain from these energetic treatments.

From numerous observations made by the authors it is clear that arsenobenzol injected at the height of syphilis, at the beginning of the secondary period, is more apt to provoke accidents or complications on the part of the nervous system, therefore we cannot advise too strongly to begin every treatment of secondary syphilis with a preliminary mercurial treatment which will greatly reduce the virulence of the spirochætæ.

This neurotropism is the more marked and frequent, the more insufficient the treatment has been; thus it is seen more often after 2 or 3 injections of salvarsan than after 6 or 8. It will be observed still less if the salvarsan injections are followed by a

treatment with mercury and iodide. These complementary forms of treatment must never be omitted.

How long must this treatment be continued without interruption? This question is as yet unsolved. We may say, however, that when seen in the first period syphilis must be treated for a year without interruption and in the secondary period or when generalized for two years.

After that the treatment will be symptomatic only.

The therapeutic results obtained with arsenobenzol are directly proportioned to the dose employed and to the length of treatment; indirectly to the number of spirochætæ and their degree of resistance.

Doses which are too weak (0.05 of salvarsan) sometimes overexcite the virulence of the infectious agent (Herxheimer's reaction), while the massive doses destroy it promptly. (The maximal dose of salvarsan must not exceed 0.90 of salvarsan or 1 gramme 20 of salvarsan, which is in reality excessive.)

The medium doses will in general be preferred and neosalvarsan will with advantage supercede the old 606, which is more toxic and is more difficult to employ.

It is best to begin with doses of 0.15 to 0.25 of neosalvarsan in 3 cc. of water. Three days later when there was no reaction 0.25 to 0.30 are injected and thus the doses may be increased with five to ten day intervals up to 0.60 and even 0.90 if the treatment is well borne. This last dose may be repeated three or four times according to the gravity of the case and the tolerance of the patient, but the intervals between the injections must always be gradually increased, so that in the cases in which it is well tolerated the treatment lasts about 2 months. In **urgent** cases the intervals may be shortened (every 5 or 6 days), but not the least reaction must ever be produced, because we must not forget the cumulative and very markedly toxic effect of all arsenical preparations.

The experimental researches of Hata have shown that arsenobenzol injected into the blood current is rapidly eliminated, while when injected under the skin or into the muscles it takes much longer to become absorbed. Therefore, some authors have recommended to make alternately an intravenous and an intramuscular injection so as to keep the spirochætæ continually under the parasiticide influence of the arsenic. This certainly is to be desired; but why try to obtain everything from the arsenic alone when we have in mercury a complementary therapeutic agent which can be of the greatest service. Injections of grey oil alter-

nating with those of salvarsan have been praised. What we think of insoluble mercurial injections we have stated before.

The following is at present my usual practice. I first submit my patients to a series of intravenous injections of enesol (sallylarsenate of mercury) 3 cc. per day; at the end of one week I make an injection of neosalvarsan or galyol of 0.15 and I continue from the next day the injections of enesol, may be every day or every other day. After from 3 to 8 days I inject 0.30, then 0.45 of neosalvarsan, and then further, progressively, during 6 weeks or 2 months; but if the least sign of reaction appears the treatment must be stretched by pauses of about a month.

I have the impression that this method prevents accidents; the arsenobenzol is not only supported by the mercury in its action on the spirochaetae, but is also rendered less toxic and less apt to cause the Herxheimer and other reactions.

The two medicamentous actions are not simply added to each other, they multiply and strengthen each other.

Naturally the doses must vary according to the resistance of each patient, the eye, sex, body weight, etc.

In any case, we must always commence with weak doses and increase them very carefully and only when the previous dose has been tolerated perfectly without any reaction; on the other hand, if the patient has felt at all badly, has had a headache or vomited, instead of increasing we must reduce the next injection; it is better to act slowly and for a longer time than brusquely and too strongly.

Subconjunctival injections of neosalvarsan are not to be recommended; they hurt atrociously, yet they might be tried in very grave cases; on the contrary, subconjunctival injections of salvarsanized serum are painless and in the dose of 1 to 2 cc. every other day in cases of iritis, choroiditis, vitreous opacities, they may aid very much in the general treatment, they act by the salvarsan which they contain (?) as well as through the serum (see chapter on autoserum therapy).

Let us look more closely at the results obtained by arsenical medication in the different ocular affections. Ehrlich in the beginning of his experiments, put on his guard by the accidents caused by atoxyl and arsacetin to the optic nerve, had recommended avoiding arsenical medication in all cases in which the eye has already become affected; however, to-day everybody uses salvarsan in ophthalmology and even in cases of optic nerve atrophy, provided that this is in its beginning and that the treatment is stopped at the least decrease of the field of vision. In

advanced cases it is better to abstain or at least to use only very weak doses or to use only salvarsanized serum. The neurotropism of salvarsan, although exaggerated by some, does in reality exist.

In optic neuritis, retrobulbar neuritis, or axial neuritis, as well as in muscular paralysis we must be extremely careful. We must never use arsenical medication unless the patient consents.

The now frequently adopted practice of lumbar puncture has permitted us not only to establish more firmly the diagnosis of cerebrospinal affections (presence of infectious agents, increase in albumen and formed elements, Wassermann reaction), but has shown, also, that unfortunately arsenic does, so to speak, not enter into the cerebrospinal fluid; at any rate the quantity which does would be insufficient to kill the spirochætae. The conclusion followed that in order to act on the nervous centres it would be well to make the arsenobenzol enter the cranial cavity or the spinal canal. First neosalvarsan which had been diluted with the quantity of spinal fluid withdrawn was injected. This method has certain inconveniences, sometimes it caused a violent local reaction. Lewinsohn relates a case in which paralysis of the respiratory centre resulted from one lumbar injection of neosalvarsan. Artificial respiration for one hour, then voluntary efforts for four hours, finally re-established normal breathing. The trial was made to avoid such reaction by injecting the serum of the patient himself; this serum was prepared from blood obtained from the patient one or two hours after an intravenous injection of arsenobenzol or galyol. From a vein 100 to 150 cc. of blood are withdrawn, centrifuged, the serum is decanted and submitted for half an hour to a temperature of 56 degrees. In ampules this blood is well conserved and can serve for intrameningeal and subconjunctival injections. The same procedure has been used for bringing mercurialized serum to the nerve centres. The intracranial injection is said to have given the best results (Levaditi, Marie and Martel) since we know that by intravenous injection it is very difficult, if not impossible with a single cure with 606, to render normal the pathologic cerebrospinal fluid; but when the normal condition of this has been obtained it definitely remains so; the more recent the syphilis the more rapid is the effect of the treatment.

In old cases with sequels an intermittent treatment must be given with repeated analyses of the cerebrospinal fluid. These repeated lumbar punctures are profitably made use of in order to inject salvarsanized or mercurialized serum. First a certain

quantity of cerebrospinal fluid is withdrawn, then replaced by the same quantity of serum at body temperature. The reaction is seldom great, at any rate it is easily overcome by an injection of morphine.

The favorable results have already reached a large number.

Optic neuritis and infiltration of the papilla.—Neisser, Michaelis, Wechselmann, McDonagh, Zentmayer and others have reported cases which had withstood mercury and iodide and which receded very rapidly and completely under the influence of salvarsan. Fehr, Stuelp, Schanz have had good results; Elschnig, Wechselmann, Knapp and especially Hirsch have with 0.50 salvarsan seen an improvement of vision, an enlargement of the color field in cases of beginning and progressive atrophy combined with basal meningitis. True, Schanz, Willig, Riecke, etc., have not been as fortunate in atrophies, and Finger has even observed a case in which salvarsan has made the unfortunate optic nerve, which was just beginning to get pale, much worse. Professor Ehrlich when probing this case to the bottom found that the patient had already been treated in 1902 with massive doses of arsacetin and enesol; he was, therefore, literally saturated with arsenic and the salvarsan formed only the drop which made the cup to overflow.

Oppenheim, Kowaleski, Fischer, Sterne, Hess, relate cases in which after one treatment with 606 of a non-ocular syphilitic affection they have seen a neuroretinitis appear which disappeared under the classical specific treatment. The question was whether this was a syphilitic relapse or an arsenical intoxication. According to Ehrlich it was undoubtedly a new localization of the spirochætæ which could not be laid to the 606. He advised a further injection of this remedy in order to produce a complete sterilization of the organism. Such experiences are rare with a mixed treatment of 606 and mercury.

Paralysis and paresis of the ocular muscles.—Treupel, Hoffmann, Nacht, T. Marie, Wibo, have with more or less success treated cases of paralysis and paresis of the muscle of accommodation, of the oculomotor, of the right abducens, of the levator, etc. Ptosis, strabismus, immobility of the pupil, diplopia have disappeared rapidly and completely under the influence of 0.60 of salvarsan. In certain cases some authors have observed the disappearance of the Argyll-Robertson pupil or of the paradoxical metasyphilitic reflex after one treatment with salvarsan.

Sterne, Milian, Williage, Killer, have not seen a notable improvement from 606; in the large majority of their cases the results were negative, especially when the paralysis was old.

Lesions of the retina and choroid.—Auschelick, Wechselmann, Grosz, and especially Hirsch, have nothing but praise for 606 in cases with choroididitic foci and retinal gummata. The remedial action was sometimes very marked and rapid. In a case of grave tertiary syphilis with multiple gummata, general arteriosclerosis, Hirsch had occasion to observe after 0.50 of salvarsan the happy modification which progressively took place in the retinal circulation, and the patient was greatly improved. Orcutt obtained two absolute improvements in cases of neuroretinitis.

Finger, Nacht, Igersheimer and Hess on the contrary have seen no success whatever from this treatment.

Interstitial keratitis.—Wechselmann, Fraenkel, Lindenmayer, Becker, Seligsohn, etc., have had some positive results, especially in young individuals, but the general opinion is rather against 606 in this affection. Ehrlich explains this by the small amount of vascularization of the corneal tissue which renders the penetration of arsenobenzol almost impossible in this organ. It is well to select the cases and submit only those to the treatment whose cornea is succulent and vascularized, leaving untouched the sclerosed and purely leukomatous cases. Thus sometimes remarkable results are obtained, especially with a mixed treatment of arsenic, mercury and iodide. The following fact must be noted; in cases in which photophobia and lacrimation are very marked, arsenobenzol makes these troublesome affections disappear rapidly. This is a clinical proof of its action. Fehr, Fradkine, Colombo, Steindorf, Gorbounoi, Knapp and Orcutt, have had a good average of favorable results.

In syphilitic iritis Zeisel, Werther, Grosz, Lieskind, Gluck, McDonagh, Fehr, Fradkine, Seidel, Colombo, de Lapersonne and Becker have obtained a perfect cure in 10 days in cases of generalized adenopathy, roseola, nightly headache, tonsillar ulcers, etc. Schanz, Wechselmann, Hess and others have, also, seen disappear in six to eight days cases of grave iritis with posterior synechiæ, exudation into the anterior chamber and opacities of the vitreus.

These favorable cases surpass in numbers by far those without success. It (arsenic) should be tried wherever there is a possibility and especially in cases in which mercury has failed. True, mercury and aspirin heal, also, most cases of iritis, therefore it is best not to use arsenic except in those rebellious cases.

Sympathetic ophthalmia.—Based on Gradle's finding of spirillæ in three cases of traumatic iridocyclitis, Fleischer conceived the idea to treat sympathetic ophthalmia with 606, but he obtained

no result whatever in two cases treated with doses of 0.25. On the contrary, Siegrist saw an improvement in one case; de Ridder, Landrieu, Coppez, Morax and Orcutt have obtained some improvement.

Browning in 17 cases of sympathetic ophthalmia with a negative Wassermann treated with 606 has observed an improvement with diminution of the mononuclear leukocytes (always increased in sympathetic ophthalmia). Lang has confirmed these facts. Manolescu has in two cases seen a beneficial action of 0.60 salvarsan. Since then many cases without result have been reported.

Glaucoma.—Morax has published three cases of glaucoma decidedly improved; probably he dealt with syphilitic subjects as happened in a case related by Góldzieher.

Salvarsan certainly influences surely and rapidly the syphilitic affections of the *lids* and *orbital walls* and the lacrimal apparatus, the cutaneous lesions rich in bloodvessels, and this the more so if the lesions are acute, recent and of a really inflammatory type.

The primary affects of the lids (indurated chancre) are beneficially influenced by a salve containing 10 per cent. of neosalvarsan.

Elschnig, however, reports two cases of aggravation of the infectious process.

Axenfeld, Cohn, Treupel, have seen some rare cases of relapses after 2 or 3 months.

Technique of the injections and choice of the arsenical salt.—The intravenous route is the most sure and most practical and has, moreover, the great advantage of being painless. This technique has been used for a long time in mercurial medication.

Neosalvarsan being soluble in all proportions in water, it is easy to dissolve it by simply injecting freshly distilled water into the ampule itself, which contains the powder (sometimes it may be necessary to reinject it 2 or 3 times to get a complete solution), then the fluid is reaspired by the syringe to inject directly into the vein. The injection must be made very slowly, thus avoiding the often very marked cephalic congestion produced by the vaso-dilating action of remedy and by the increased blood-pressure. In individuals which are easily impressed it will be well to make at first a hypodermic injection of one-half milligramm of adrenalin. The patient must always be in a reclining position during the injection.

He is not to arise until 2 hours have elapsed; then he may go home and remain resting for the day.

As regards the choice of the preparation we are at present employing novarsenobenzol and leave the old salvarsan aside, the hypothetical superiority and the very great toxicity of which joint to its difficult solution, cannot inspire us to prefer it to neosalvarsan. We lay aside, too, salvarsan natrium, highly praised lately, which has the same inconveniences as 606, demanding long continued injections of 50 to 80 grammes of fluid. For intramuscular injection we prefer galyl (tetraoxydisphosphotetraminodiarisenobenzene) which contains 35.3 of arsenic and 7.2 of phosphor. This product is more active than salvarsan, but since the greatest therapeutic action is always combined with the greatest danger of intoxication, it is best to be satisfied with small doses. Galyl comes in ampules containing the oily solution ready for injection in varying doses, from 0.05 to 0.40; we have always a product the intramuscular injection of which is of real efficacy and the employment of which, as we have mentioned above, may be alternated with intravenous injections of neosalvarsan, which we continue to consider more practical than any other arsenical agents on account of its perfect and easy solubility in a nominal quantity of water and without any further preparation.

Hectine does not seem to have any appreciable advantage over the other products which we have mentioned; yet in the form of hectargyrium it may be of service when pills of 0.10 are administered twice a day for 10 days as a complementary treatment.

The newly arrived luargol, a combination of arsenic and antimony, the slight toxicity of which has been praised at first, is evidently toxic in spite of it since there are already grave accidents credited to its use.

Every day new products are introduced. When they have been proven, we will study them later.

Sulphur medication has always been a valuable adjuvant in the treatment of syphilis; it prevents or attenuates the mercurial accidents and enhances the action of the other antisyphilitics. To-day sulphur seems to regain its former place in the form of intramine (diorthoaminothiobenzene).

Comparing the action of intramine with that of salvarsan, McDonagh has found that in the primary period of generalization salvarsan exerts a more marked action while in the secondary or tertiary period intramine has the advantage. Moreover, the previous use of arsenical preparations strengthens the action of intramine in the initial period, and in later syphilis intramine will enhance the action of the metallic compounds, salvarsan, galyl, etc., when later injected.

When intramine is administered at the beginning of syphilis, the spirochætæ are not killed, and if then salvarsan is injected its action is astonishingly weak; when on the contrary salvarsan is injected first and intramine afterwards, the effect is most marked.

In late syphilis intramine should first be employed. In meningo-spinal syphilis the pains disappear in 24 hours. In degenerative myelitis the subjective symptoms are often improved; the same is the case sometimes in certain cases of encephalitis.

Finally McDonagh advises the following: In primary syphilis he prescribes 2 or 3 grammes of potassium iodide per day, and injects into a vein a strong dose of galyl or salvarsan. Three days later he makes an intramuscular injection of 1 or 2 grammes intramine. About the seventh day another strong intravenous injection of galyl or salvarsan, and he continues the treatment for one year in the following manner: (1) A series of 8 intramuscular injections of gray oil of 0.10 to 0.15 of mercury every fortnight. (2) A series of 8 injections of intramine, 1 to 3 cc. every two weeks. These injections alternate with those of gray oil. (3) One out of three months he gives potassium iodide internally. The first month is to begin after the 4 first doses of mercury and intramine. (4) A month of rest follows the series of 8 injections of intramine and mercury (4½ months of treatment).

In secondary syphilis he first prescribes iodide in conjunction with two strong intravenous injections (As) and two intramuscular injections of intramine as above, then 4 series of the same treatment of mercury and iodide with intramine; two months after the last injection of the fourth series he makes another maximal intravenous injection preceded or followed by an intramuscular injection of a strong dose of intramine.

In late recurrent syphilis he makes first one or two intramine injections followed by two of galyl or salvarsan, then a mixed cure of mercury, iodide and intramine.

In cases of myelitis or degenerative encephalitis: (1) an injection of intramine; (2) on the fourth day a spinal injection of serum taken from the patient the day before; (3) 3 or 4 days later an injection of salvarsan (no galyl or karsivan, which are too toxic); (4) 3 days later a new spinal injection of serum taken from the patient the day before. These injections are continued thus alternately till the cerebrospinal fluid has become normal.

In congenital syphilis the mixed treatment is continued for two years, but the mercury is uninterruptedly administered by mouth.

McDonagh concludes that we have in this new synthetic combination of sulphur, intramine, a very efficacious agent in the treatment of syphilis and even of other malignant infections, like tuberculosis, gonorrhœa, etc.

Neosalvarsan can, also, profitably be administered in the form of clysmas and suppositories.

ABSTRACTS FROM MEDICAL LITERATURE.

BY W. F. HARDY, M.D.,

ST. LOUIS, MO.

INTRACRANIAL SURGERY AND ITS RELATIONS TO OPHTHALMOLOGY.

Basing his views upon his last 200 operations for intracranial disease, Elsberg, of New York (*N. Y. State Jour. of Med.*, November, 1916), gives his impressions regarding the relations of ophthalmology and intracranial surgery. He believes that papilloedema in the large majority of cases is due to a mechanical cause, viz.: increased fluid tension. Why it occurs in some instances and not in others, as, for instance, large frontal tumors, cannot at present be satisfactorily answered. Internal hydrocephalus usually causes papilloedema, but some cases run their course without any change in the disc. Papilloedema may reach a high grade very rapidly and retinal hæmorrhages occur over night. It may, Elsberg states, subside also with great rapidity. Two cases are cited illustrative of this. Reference is made to the well known fact that good vision may exist for a long time with a high grade choked disc. A frequent question asked is: Will sight improve or not? The author gives his experience in answer to that. Papilloedema of short duration, he states, even if advanced and with marked diminution of vision, may, after operation, entirely disappear and normal vision be regained. Sudden blindness from acute choking of the discs is, after operation, usually entirely recovered from. Loss of vision from long standing papilloedema is usually permanent. It is useless to

expect a quick operation in such instances to do any good. In most instances if vision is lost for twenty-four hours from advanced choked discs, it is usually lost for good. Elsberg hopes the time will come when choked disc is considered a late and not an early symptom of brain tumor. Every effort should be made to quickly exclude other disease in a patient with papilloedema.

The results of the first eye examination in 63 cases of brain tumor at the New York Neurological Institute showed 39 had well marked swelling of the discs. That 62 per cent. of the patients should have sought aid only when they had marked papilloedema, is termed nothing less than appalling and indicates that ophthalmoscopic examinations are put off too long. As to the question of ipsilaterality nothing definite was manifest. Studied from a different viewpoint, i.e., that of post-operative subsidence of the papilloedema—the following interesting facts were discovered:

In 84 per cent. of the patients the papilloedema of the eye on the same side as the tumor subsided much more rapidly after the growth was removed than that of the opposite side. If a decompression was done the papilloedema subsided more rapidly on the side opposite to that of the tumor, unless the tumor was located on the same side as the decompressive operation. If a bilateral decompression was done then the eye contra-lateral to the side of the tumor improved more rapidly.

Elsberg agrees with Foster Kennedy in the claim that enlargement of the blind spot is especially frequent in tumors of the frontal lobes and that a paracentral scotoma is a frequent finding in frontal new growths. Attention is called to the fact that some tumors of the brain may attain considerable size without giving rise to headache. The only evidence of an expanding lesion may be the changes in the eyegrounds or in the fields of vision. Steadily enlarging paracentral scotomata and increasing papilloedema may be the sole reasons for the patient seeking aid. Absence of headache should not prove misleading.

Clifford Walker brought out the point in discussion that sudden change in the swelling of the discs is unlikely, that two weeks rather than two days are required for choked disc to subside. Error in measurement is often made. "Again, after operation the examination seems to be made with a certain optimism; the disc is expected to be of lower measurement and sometimes is recorded absurdly low." Color interlacing as an index of cerebral pressure has been overestimated and is of little importance.

SYPHILITIC KERATITIS.

Hicks, of San Antonio, refers to the treatment of syphilitic keratitis (*Southern Med. Jour.*, November, 1916) by an old remedy with a practically new method of application. The failure of salvarsan and neosalvarsan in this disease is mentioned; corneal lesions beginning at the margin and spreading towards the center are treated locally by Hicks with atropine, whereas eserine is used in those beginning in the center and spreading to the periphery. The general treatment, and it is for that that Hicks claims a new application, is the intravenous injection of bichloride of mercury. The administration is simple and cheap, which recommends it. The dosage varies from $1/5$ to $1/12$ grain. It is dissolved in 20 cc. of normal salt solution or plain sterile distilled water. The results, while not spectacular, were gradual and gratifying. Injections are given at four day intervals. Five case reports are given. One patient received as many as twenty injections. The author makes it clear that his experience with the method is limited and that new procedures are commonly hailed as cures only to be later discarded as worthless. Dr. Wooten in discussion pointed out the advantages in charity hospital work. Disadvantages are an occasional phlebitis from administering too concentrated a solution of bichloride, and irritation of the kidneys shown by epithelial and granular casts, when the injections are given with insufficient intervals.

INTERNAL SECRETIONS AND EYE DISEASES.

Schirmer, of New York (*New York State Jour. Med.*, January, 1917), states that the doctrine of internal secretions is of recent date. Hyper-, hypo- or dysfunction may produce conditions inimical to the bodily welfare. The clinical picture of hypofunction differs according to the gland affected. Hyperfunction is incompatible with the normal condition of the body. All diseases due to hypophyseal trouble refer to the optic nerves, rarely to the motor nerves of the eye. They are the result of pressure. The characteristic optic nerve affection is descending atrophy from direct pressure, sometimes papillitis or choked disc, a symptom of the increased intracranial pressure. The fields are usually those of bitemporal hemianopsia, some few, however, show an homonymous hemianopsia or concentric contraction of the form and color fields. A notable fact is that pressure

may paralyze the fibers for a long time and abolish vision without destroying the life of the fiber. In such cases after operation vision may be more or less completely restored. The hypophysis swells considerably during every pregnancy and shrinks after delivery. With repeated pregnancies retrogression may not be complete and eye symptoms may result therefrom. The eye disturbances from pineal disease are neighborhood symptoms and not the result of secretion. The close position of the corpora quadrigemina accounts for the frequency of eye muscle symptoms. Another constant finding is choked disc, rarely optic atrophy. In Graves' disease, Schirmer does not accept the theory which attributes the wide palpebral fissure to a hypertonus of the levator. He assumes that even at an early stage there is a swelling or even hypertrophy of the orbital fat, which keeps the eyeball protruded. In support of this he cites the persistence of exophthalmus after complete operative cure of the Basedowian symptoms; after Kocher in 45 per cent. of the cured cases. Optic atrophy may result from an excess of thyroidin. This has been produced experimentally and has been observed from feeding a myxœdematous man thyroidin. Coppez observed retrobulbar neuritis with vision reduced to one-tenth, central scotoma and changes at the disc, as in alcohol amblyopia, in five patients who were perfectly healthy and who took thyroidin tablets in order to grow thin. The symptoms developed after six to eight weeks. Discontinuance of the thyroid led to a slow but complete recovery. It is strange that the same substance should produce in some cases inflammation and in others atrophy of the optic nerve. Its analogy is found, however, in the toxin of the spirochæte pallida.

The antagonism between Graves' disease and myxœdema is shown in their eye symptoms. In the former we find wide palpebral fissure and exophthalmus; in the latter deep set eyes and narrow palpebral fissure. In exophthalmic goitre various nerve affections are present; in myxœdema and allied diseases normal nerves are found. The only exception to this is a case of Wagner's with optic atrophy in a myxœdematous woman. The only positive eye symptom in myxœdema is a scarcity of hair on the eyebrow, especially the temporal half. The optic nerve is always found healthy in tetany, which is the result of parathyroid disease. Here tetanic spasm is the commonest symptom; exceptionally eye muscles are involved resulting in diplopia, blepharospasm or contraction of the pupil. These cramps come and go. Conjunctivitis and cataract may result from parathyroid disease. Tetany cataract is usually of the central or lamellar type, espe-

cially in children. In adults the cataract is cortical and may mature rapidly. Cataract is frequent in diabetes and the close relation of diabetes to internal gland secretion is pointed out. The connection between diabetic eye complications and internal secretions is not so close as between tetany and cataract, or between optic atrophy and Basedow's disease. The eye changes in diabetes are not primary, but are secondary to the changes in the metabolism. A brief reference is made to Paget's disease, which is thought to be of endocrine origin. This trouble is characterized by rarefaction, hypertrophy and deformity of the bones. The skull especially is involved at an early stage. Schirmer had a stubborn case of chronic iridocyclitis and optic neuritis in a patient with Paget's disease. The article is concluded with a discussion of the Abderhalden method and its possible application in endocrine pathology, which of course takes us far into the field of speculation. Schirmer's article is rather difficult to abstract and should be read in the original.

OCULAR VERTIGO.

Vertigo, says Harwood (*Lancet*, December 16, 1916), is a consequence of insecure equilibrium and may result from a central or peripheral defect. The eyes are not the least important of the the peripheral organs. They may give us fallacious information, either because they have to deal with abnormal surroundings, or because they are in themselves abnormal. Ocular vertigo may result in either case. Dizziness from looking down from a height is an example of the first, and that caused by a paralyzed extraocular muscle an example of the second. Every normal healthy eye has its own normal standard of visual acuity. The visual ideas we have are based on this normal standard whatever it may be. As years advance some impairment of vision is inevitable, except in the perfectly emmetropic. Such a process in a healthy person is a very gradual one, the visual apparatus as a whole is stable and there is no tendency to giddiness. On the other hand, vertigo is common on the first adoption of a correcting lens. When an inaccurate lens is adopted vertigo is more probable. The presence of an uncorrected error of refraction is always a potential cause of dizziness. Heredity plays a great part as does also modern education and occupation in producing an unstable muscular mechanism. Once the latter is unstable, giddiness may occur when any special strain is put upon it, as by reading close work, change of posture, locomotion, picture

shows, glare, outdoor sports, in fact, by any kind of fatigue. The importance of the ocular element is that it is an almost constant factor and that the eye is the only part of the nervous system that admits of direct mechanical assistance, which should be given in the form of an accurate correcting lens when the condition does not readily yield to other measures. The ocular element in this way may be eliminated and wasted energy saved. To accurately fit the rigid to the less rigid is difficult, and a lens that only substitutes one error for another is useless. A latent muscle-balance defect, especially a hyperphoria, is a frequent source of giddiness.

RECURRENT SARCOMATA AT THE LIMBUS TREATED BY "ELECTRICAL DESICCATION".

Burton Chance, of Philadelphia (*Penn. Med. Jour.*, December, 1916), advocates the treatment of recurrent tumors of the anterior segment of the globe by "electrical desiccation," a therapeutic measure successfully practiced by Clark, also of Philadelphia. Dr. Clark read a paper on this subject at the 1916 meeting of the American Medical Association. Two case histories of patients with recurrent epibulbar carcinoma are given. By desiccation is meant the dehydration of tissues by means of heat applied in the form of an electric flame, produced by a high frequency current, whereby the vitality of tissue cells is destroyed. The heat is produced by a monopolar electric current of high tension generated by a static machine and then transformed. The heat flame must not be so intense as to char the tissues, and flows from the point of a fine needle. This is not to be confounded with fulguration. The technic of Dr. Clark is as follows: Local anæsthesia with cocaine and adrenalin. A fine needle is fixed in a suitable insulated hand piece. The current is made and broken by an assistant at the direction of the operator. The thermic intensity of the flame is tested on metal. No arbitrary rules can be given for the application of the flame, different cases demanding different strengths. The needle is not thrust into the tissues, but is brushed over the surface of the mass to be removed. The depth of the desiccation depends on the time of the contact and driving power of the current. It is not necessary to visibly destroy all of the area that the heat penetrates. In anterior growths the cornea should be protected by a metal spatula. After the tumor is converted into a necrotic mass, it is curetted away. A conjunctival mass may be allowed

to macerate and slough. The method is rapid and bloodless. Infection cannot readily occur. The healed surface presents neither scar, distortion nor other cicatrizing process. The method may be repeated. Chance does not advocate the procedure to the exclusion of ordinary surgical methods. Desiccation is preferable to radium and other rays, as its action is constant, the flame can be seen and confined to a definite area. The sight should not be damaged by its use.

DISTURBANCES OF VISION FROM CEREBRAL
LESIONS, WITH SPECIAL REFERENCE TO
THE CORTICAL REPRESENTATION
OF THE MACULA.

Gordon Holmes and W. T. Lister, in a long article (*Brain*, June, 1916), based upon extensive observations in French base hospitals, give the results of their labor, covering a period of eighteen months, in studying the effects of injuries in various portions of the optic system upon vision. Their conclusions, which they state cannot yet be regarded as final, may be formulated concisely:

(1) The upper half of each retina is represented in the dorsal, and the lower in the ventral part of each visual area. (2) The centre for macular or central vision lies in the posterior extremities of the visual areas, probably on the margins and the lateral surfaces of the occipital poles. (3) That portion of each upper quadrant of the retina in the immediate neighborhood of, and including the adjacent part of, the fovea centralis is represented in the upper and posterior part of the visual area in the hemisphere of the same side, and vice versa. (4) The centre of vision subserved by the periphery of the retina is probably situated in the anterior end of the visual area, and the serial concentric zones of the retina from the macula to the periphery are probably represented in this order from behind forwards in the visual areas.

A CASE OF "BLOODY TEARS".

Cases of "bloody tears" are among the curiosities of medical literature. In the *Boston Medical and Surgical Journal* of October 26, 1916, Dr. M. J. Konikow has reported the case of a man, aged 50, who had been in good health except for attacks of slight epistaxis. An attack occurred which he and the members of his family could not control by ordinary means and Dr. Konikow was summoned. Blood was flowing freely from the right nos-

tril. An anterior tamponade failed to stop it, merely directing the flow backwards. Complete stoppage was obtained only by anterior and posterior tamponades. A few minutes later large "bloody tears" began to run down the cheek from the right eye. Pressure on the right nasal duct stopped this flow. Of course the source of these "tears" was the blood that was caught between the tamponades and forced into the nasal duct. True sanguineous lacrimation, i.e., "bloody tears" produced directly by the lacrimal gland—must be extremely rare, if indeed it has ever occurred. In the Transactions of the Ophthalmological Society for 1890-91, Mr. F. R. Cross reported the case of a female, aged 21 years, who for several years had been suffering from bloody tears, coming occasionally from the left eye. Excluding other sources, Mr. Cross thought that the lacrimal gland was responsible for this phenomenon. Half a century ago, Hasner reported two cases of bloody tears, one in a girl of 13, who showed this symptom during the two years preceding her first menstruation; the other in a healthy young butcher in which the cause of the trouble lay in a lentil-sized polypus of the upper conjunctiva.

S. W. Ochapowski reported a case of "bloody tears," which he attributed to the general hysterical character of the patient—a sufficiently puzzling diagnosis.—(*The Lancet*, Dec. 2, 1916.)

REVIEWS.

THE BRITISH JOURNAL OF OPHTHALMOLOGY.

The first number of the *British Journal of Ophthalmology* has reached us in due time. Our readers will remember that it is to take the place of three former British Ophthalmic Journals. The contents, as was to be expected, are of a high order. The print, illustrations and general make-up are as good as can be.

THE NERVO-MUSCULAR MECHANISM OF THE EYES AND ROUTINE IN EYE WORK. By G. C. Savage, M.D. Published by the Author. 1916. Nashville, Tenn. Price \$1.00.

This little booklet is made up of two reprints of papers read by the author at medical societies. The first one, "On the nervo-muscular mechanism of the eyes," gives a résumé of the author's views on this subject, of which he says: that in all the domain of ophthalmology there is no other subject of equal importance. The second paper, "On routine in eye work," gives good rules, to beginners particularly, concerning the managing of office cases, dwelling particularly on the way the author has found most practical.

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